A Brief History of Irradiated Nuclear Fuel Shipments:

Atomic Waste Transport "Incidents" and Accidents the Nuclear Power Industry Doesn't Want You to Know About

The nuclear industry would have you believe that the transportation of irradiated fuel rods is completely safe. Its Washington, D.C. lobbying arm, the Nuclear Energy Institute (NEI), claims that 2,900 shipments of irradiated nuclear fuel have traveled U.S. highways and railroads since 1964 with absolutely no radiation leaks nor container cracks. Although NEI admits that eight accidents have occurred, they quickly point out that only four involved containers loaded with "used" (a euphemism for highly radioactive) nuclear fuel.

But in a 1996 State of Nevada Agency for Nuclear Projects report (based on U.S. Atomic Energy Commission and Department of Energy documentation), "Reported Incidents Involving Spent Nuclear Fuel Shipments, 1949 to Present," a full 72 "incidents" are briefly described. 4 involved "accidental radioactive material contamination beyond the vehicle," 4 contamination confined to the vehicle, 13 traffic accidents with no release or contamination, 49 of accidental container surface contamination, and 2 incidents with no descriptions. Three of the incidents resulting in contamination beyond the vehicle occurred in 1960 (a leaking rail cask that contaminated "small areas" at three rail yards), 1962 (a leaking truck cask that contaminated a roadway), and 1964 (a leaking truck cask that contaminated a terminal) – which may explain why NEI has chosen 1965 as the year to start counting "safe" shipments. However, a "slow drip from bottom front end of empty cask while stored in transportation terminal" occurred in a truck cask in 1984. Why aren't these incidents acknowledged by NEI? The report listed incidents as late as the early 1990's. The report noted the scant nature of available data: "Description of the events and equipment are insufficient to evaluate the failure mechanisms or sources of contamination." Such poor documentation will make it difficult to learn from past accidents. In addition, information on shipments of U.S. Navy irradiated nuclear fuel is classified from the public "for reasons of national security": if there have been incidents or accidents, it will be difficult or impossible to find out.

Upon closer examination, though, innocent enough sounding "incidents" are actually quite significant. An 8/25/1980 incident is reported as "surface contamination on cask," but there's much more to the story, as Dr. Marvin Resnikoff revealed in his classic 1983 book <u>The Next Nuclear Gamble: Transportation and Storage of Nuclear Waste</u>…

A NAC-1 truck cask (a Nuclear Assurance Corporation container capable of shipping one irradiated fuel assembly) was delivered to the San Onofre nuclear plant in California on August 20, 1980. Unknown to the workers about to handle the cask at San Onofre, this cask had been used four months earlier to ship a leaking fuel assembly from the Oyster Creek, NJ nuclear plant to a research facility near Columbus, Ohio. The cask had become so severely contaminated in the process that NAC added external lead shielding, to try to lower the exposure to workers and the public from the harmful radiation doses being given off.

When the *empty* cask arrived at San Onofre, the radiation level in the truck driver's cab was over twice the maximum legal limit. Two NAC technicians flew out to decontaminate the cask, which at points

emitted 11 to 40 times the legal limit of radiation. A San Onofre health physics technician assisted – his role, to safeguard the workers' health against harmful radioactivity. However, U.S. Nuclear Regulatory Commission (NRC) documents reveal that the technician was not qualified for this particular task: "He had no familiarity with irradiated (spent) fuel casks," and "he received no briefing or instruction with regard to the potential hazard" of working with this contaminated cask nor even "what procedure or actions were going to be performed."

The NAC technicians opened a capped pipe leading to the interior of the cask. Highly contaminated water began pouring out. One NAC worker caught it in a plastic bag and measured the radiation. The water emitted up to 100 rems/hour of radiation, a level high enough to deliver a lethal dose to an adult after just five hours of whole-body exposure. Shorter exposure time to such intense radiation can also lead to other forms of severe health and genetic damage. The NAC workers used a paper towel to wipe up moisture in the pipe. The paper towel then gave off an even higher 300 rems/hr. One NAC worker attempted to place the plastic bags filled with contaminated waste into a shielded container. When it wouldn't fit, "he held his breath, turned his head, pushed the bags into the cavity while puncturing them with a screwdriver". No standard air samples were taken, and no proper respiratory safety equipment was used. NRC later fined San Onofre $125,000 for lax health physics supervision. Water samples showed that contamination was so high that the release of several gallons of water from this cask could have resulted in billions of dollars in clean up costs.

The very same NAC-1 cask later exceeded its radioactive decay heat temperature limit, had a leaking valve, and had a radioactive "hot spot" that mysteriously moved from one end of the cask to the other *after* it had been decontaminated several times.

In Feb., 1981 another NAC-1 cask at Oyster Creek was found to have surface contamination, even though it was empty and had not shipped fuel for five months. A layer of heavy paint was applied to hold the contamination in place during the cask's next journey, to Ohio. However, water soluble paint was used. It began to dissolve during a rain storm in Pennsylvania. The drivers noticed the paint peeling off, but continued on, apparently oblivious that radioactive contaminants were probably falling off onto the highway for hundreds of miles. How much radiation was released will never be known. NAC took 5 days to report the incident to NRC, which then took no action anyway.

High surface contamination incidents continued. Casks arrived at the La Crosse, WI nuclear plant with radiation levels 90 times the legal limit. NRC allowed the casks to be used, merely requiring them to *be wrapped in a large plastic bag*. Only *after* the shipments were completed did NRC require the casks to be decontaminated. Unfortunately, the La Crosse management did not warn their workers about the cask, and several were contaminated when they handled it without gloves. The NRC reported that in less than a year, this particular cask had excess surface contamination 7 times, and released some radiation during transit.

NAC also had used faulty casks for more than 5 years, from 1974 to 1979, to ship irradiated fuel more than 300,000 miles. The casks bowed out of shape, a defect that NRC noted could compromise its crashworthiness. However, NAC only reported bowing problems *after* shipments had been completed. Eventually, 4 of 6 NAC-1's were pulled from the road due to

the bowing problem. The NAC-1 had been regarded as the "workhorse" of irradiated fuel transport in the U.S. before its problems surfaced.

In addition to its "glowing" safety record, the U.S. nuclear industry also speaks proudly of its many decades of experience in transporting "spent" nuclear fuel. However, 2,900 shipments over the past 35 years averages out to just over 80 shipments per year. Most of those involved relatively short transport distances (traversing 3 or fewer states), and took place many years ago. The 1970's and early to mid 1980's account for most of the irradiated fuel shipments. From 1988 to 1997, there were only 205 total shipments in the U.S. In 1996 and 1997, there were only a total of 30 shipments. For more than a decade, there has been very little experience accumulated. In the year 2001, a grand total of 3 truck shipments were carried out under the Dept. of Energy. Under the proposed Yucca Mountain scheme, there could be three or more shipments daily for decades into the future. Thus, there have been very limited numbers of shipments, traveling very limited distances, carrying limited amounts of irradiated fuel, over the past two decades. In fact, many of those with the most experience in irradiated fuel shipment within the nuclear industry have already retired.

When confronted about the serious lack of experience in the U.S., the nuclear industry often points to the European and Japanese experience. There have been much larger numbers of irradiated fuel shipments in Western Europe and Japan, because those countries send irradiated fuel to reprocessing facilities. However, Europe has had its own irradiated fuel transport controversies.

The numbers alone show the intensity of the resistance to irradiated fuel shipments to "interim storage" sites in Germany. March, 1997: 6 casks, 173 injured, 500 arrested, 20,000 protestors, 30,000 police, $100 million. March, 1998: 6 casks, scores injured, 1,000 arrested, 7,000 protestors, 30,000 police, $100 million. November, 2001: 6 casks, dozens injured, hundreds arrested, 10,000 protestors, 15,000 police, $25 million. These intense protests have significantly slowed the attempted "interim storage" at Gorleben and Ahaus, Germany. Irradiated fuel shipments between Europe and Japan, some traveling through the Panama Canal, have also been dogged by protests and controversy on a growing scale, including official opposition by Caribbean, South American, and Asian governments along the shipping routes.

From the early 1980's to the late 1990's, contamination incidents like those in the U.S. were occurring on irradiated fuel casks being shipped to and from COGEMA's La Hague reprocessing plant in France. But this was kept secret from the public by the nuclear industry and government agencies. It took the work of investigative reporters and activists to break the story in 1997. On May 12, 1998 according to Reuters, French officials admitted that contamination from German casks bound for COGEMA had exceeded radiation limits by up to 3,000 times.

When the nuclear industry and government talk about a spotless record of transporting "spent" nuclear fuel, it's important to look beneath the surface.

---Kevin Kamps, revised May 16, 2002

Nuclear Information & Resource Service, 1424 16th Street, Suite 404, Washington, DC 20036, ph. 202.328.0002, fax 202.462.2183, nirsnet@nirs.org, www.nirs.org